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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/905,096	07/13/2001	Tae-Hee Han	5000-1-121N	3542

33942 7590 11/26/2004

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EXAMINER

HANEY, MATTHEW J

ART UNIT PAPER NUMBER

2613

DATE MAILED: 11/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/905,096

Applicant(s)

HAN ET AL.

Examiner

Matthew Haney

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 16-25 is/are rejected.
- 7) ☒ Claim(s) 13-15 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Allowable Subject Matter

1. Claims 13-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, and 16-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Iwata (US 5,604,546).

As for claims 1 and 16, Iwata teaches of a plurality of difference unit (D-unit) arrays for generating an absolute value of each smallest size matching block in each D-unit array, and said each D-unit array comprising a plurality of D-units arranged to correspond with an arrangement of pixels of said each smallest size matching block in each D-unit array for calculating the differences between the pixels of a current frame and the pixels of a reference frame, and converting the differences to absolute values (Note: Figure 7 along with Figure 8A shows that absolute difference being calculated between the reference block and the current frame (i.e. the MPX (Reference Number 184) switches between odd and even on each clock cycle), Column 13, Lines 34-67); an

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accumulator connected to the D-unit arrays for generating a SAD (Sum of Absolute Difference) for said each smallest size matching block and a SAD for all of the plurality of matching blocks of pixels having non-uniform sizes by hierarchical addition of the absolute values of the smallest size matching blocks received from the D-unit arrays (Note: Figure 7 shows the results of each difference array (odd and even numbered fields difference arrays are alternated according to Reference Numbers 190-201) each of the odd difference arrays are added and each of the even difference arrays are added separately and then at the output these two sums are added together to get the total sum of differences (i.e. hierarchical addition), Column 14, Lines 1-52).

As for claims 2 and 17, Iwata teaches of an accumulator comprises a two-stage unit forming a binary-tree structure for hierarchical addition (Note: Figure 7 shows each of the odd difference arrays are added and each of the even difference arrays are added separately and then at the output these two sums are added together to get the total sum of differences (i.e. hierarchical addition), Column 14, Lines 1-52).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwata (US 5,604,546) in view of Bakhumutsky (US 6,519,005).

As for claims 7 and 22, most of the limitations of the claim have been discussed in the above rejection of claim 1. Although Iwata does not explicitly teach of using 16x8 block sizes, however, it is within the scope of the invention to get a 16x8 block by hierarchical addition (see 102 rejection of claim 1) and the comparison of 16x8 block SAD values is considered well known to one of ordinary skill in the art (Bakhmutsky (US 6,519,005) Column 8, Lines 49-67, and Column 9, Lines 1-35) because this allows for the comparison of the top and bottom fields of a field in order to get a best match frame along with a best match for the top and bottom of the field.

4. Claims 3-6, 8-9, 18-21, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwata (US 5,604,546).

As for claims 3, 9, 18, and 23, most of the limitations of the claim have been discussed in the above rejection of claims 1, 7, 16, and 22. Iwata does not explicitly teach of comparing the total SAD to a previous SAD (Iwata does disclose comparing even and odd SAD's to find the best match, Column 15, Lines 34-42), it is considered an obvious variation to one of ordinary skill in the art at the time of the invention to compare the total SAD with the total SAD of a previous result in order to find a best match (i.e. smaller SAD). One of ordinary skill in the art would have been motivated to do so in order to find the best SAD match for the entire frame so that only one motion vector would have to be formed.

As for claims 4 and 19, most of the limitations of the claim have been discussed in the above rejection of claims 1 and 16. Iwata does not explicitly teach of a 4x4 or 4x8 block size in his first embodiment, however, he does disclose that the processing units

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are arranged in an $M \times N$ matrix, which would allow for any size block to be formed (i.e. Iwata teaches of 3×4 example and a 4×4 example in another embodiment (see Figures 11 and 12A), Column 12, Lines 21-22). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use 4×4 matrix in order to get a more accurate match.

As for claims 5-6 and 20-21, most of the limitations of the claim have been discussed in the above rejection of claims 1 and 16. Iwata does not explicitly teach of a non-uniform, non-symmetrical size block (i.e. 4×8 block size), however, he does disclose that the processing units are arranged in an $M \times N$ matrix, which would allow for any size block to be formed (i.e. Iwata teaches of 3×4 example) Column 12, Lines 21-22). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use a non-uniform, non-symmetrical block size in order to perform some kinds of spatial filtering.

As for claim 8, most of the limitations of the claim have been discussed in the above rejection of claim 7. Iwata also teaches of an accumulator comprises a two-stage unit forming a binary-tree structure for hierarchical addition (Note: Figure 7 shows each of the odd difference arrays are added and each of the even difference arrays are added separately and then at the output these two sums are added together to get the total sum of differences (i.e. hierarchical addition), Column 14, Lines 1-52).

Claims 10-12 and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwata (US 5,604,546) in view of Yoshino (US 5,696,836).

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As for claims 10-12 and 24-25, most of the limitations of the claim is discussed in the above rejections of claim 9 and 22. Iwata does not explicitly teach of using ripple-carry adder (RCA) or using carry-save adders in a binary-tree configuration, however, Yoshino does (Figure 9A shows the processing elements for the search and Figure 12 shows the circuitry (tree structure), also see Column 9, Lines 53-67 and Column 10, Lines 1-8). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the ripple-carry adder because of its simplicity and compact design and the use of carry-save adders because of their processing speed when used in binary tree circuitry.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew Haney whose telephone number is 703-305-4915. The examiner can normally be reached on M-Th (7-4:30), Every Other Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chris Kelley can be reached on 703-305-4856. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Matthew Haney
Examiner
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